

MAIN CURRENTS IN MODERN THOUGHT

A monthly service that brings together contemporary data in all fields, as these issue from laboratories, studios, class-rooms, observatories and wherever man pursues the eternally intriguing and beautiful mysteries of Nature

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INTUITION

Editorial Summary

WE WITNESS TO-DAY the flow of two noble streams of thought. From Europe comes the pure, cold freshet of scientific philosophy, gathering velocity and power with every new conquest, and just now daily increased by the heat of events melting the glacier of history. From Asia flows a broad, deep, ancient river, still without effective quickening from the impetuous cataracts of European science, but moving along with its own deceptive power. This may be a Mississippi, derived from many tributaries running out of the broad plains of common human life; or possibly a Ganges, arising really from a science so remote in time, so lost in inaccessible Himalayan fastnesses and so mixed now with the soil of the plains, as to give no signs of coming to us from the pure snows whence our own scientific streams arise.

These movements are not mutually antagonistic. They are indeed confluent, and we can see an eventual juncture ahead. The question arises: Is the limpid and exhilarating stream of science to be lost in the old river of life, so turbid with common earth churned up out of lowly living? Over-confidence that the new and ice-charged waters will not be lost in the warm old river would be a mistake. The forces loose in the world are such as to bring about surprising turns. Are we to suppose that in the survival of the fittest, in human affairs, Nature takes no account of ethical values?

If pride and arrogance lead western man to make an unjust peace, perhaps to attempt violence upon Russia and deny the East its manifest rights to freedom, may this not prove that the gains in thought attendant upon Europe's previous isolation from the world-context have not included enough of spiritual values to allow of their independent continuance? Whatever kind of lower purpose we may perceive in Nature, which determines what species shall go on and what types shall fall away, may well be accompanied by a higher variant of the same laws of justice among men and nations. Imperialism, whether of the finance-capitalist or the geographical conquer-and-hold kind, seems to be as unsuited to the environment of to-day as the dinosaur's bulk, constitution and habits were to the changing world of his time. It is not impossible that we might try to cling to them, and be outmoded.

The world-forces at work appear to be on such a scale that little or nothing can be done about them through thought. But is this so? If vanity and over-confidence as to the value of our western thinking happen to be im-

portant ingredients in the arrogance which certainly has been a threat to us, then abatement of that over-confidence will be valuable. And, since we arrive at the vanity from intellectual imbalance, what better corrective is available than to ask what is common between the two streams of East and West?

To give our opening image a last daub of the literary brush, we might ask: What is the real nature of the simple water which is common to the two streams? There is an H_2O which constitutes the mass of the great river of human life, in which the rich and fecund load of mineral, vegetable and animal detritus is carried; and it is the same H_2O which forms the mass of the other stream, rich in di- and tri-hydrol likewise valuable for the life-process.

To one familiar with the sources of Eastern thought — Laotse, Buddha, Shankaracharya — on one hand and with Plato, Leibnitz and Whitehead (let us say) on the other, the fact and nature of intuition is the basis of their unity. If therefore we would have these two streams meet and run on down history without grievous loss to mankind of the adjuvant freshet of science which is so sorely needed to slake the thirst of the mind, it becomes our urgent duty to identify in man the essential nature of intuition — the inventive, creative, freshening, beauty-seeking superior partner of old creature-response. And further, we must provide this prime mover with an appropriate place in the philosophy of education, to give it the nourishment it requires.

Since the depth psychology laid bare the powerful rôle of the unconscious, unacknowledged emotion in human conduct, no one can deny the need for emotional education — though very little is done about it in a systematic way. We still go in for cure instead of prevention. It is true that there are fifty fewer patients in the New York State mental hospitals this year than there were the year before. But this is not because the number of afflicted people is smaller: it continues to grow annually. And what the war will do needs little imagination to anticipate. However, we at least have some understanding of the causes, even if the prevention must await a vast social change of attitude.

As to the nature of the superior partner to the emotions — intuition — however, we moderns still have much to learn. Perhaps the best that a European has said about intuition in our decades is still to be found in Bergson, notwithstanding the nearly universal recognition in the

life and work of the mathematicians, that most logical breed of the human species, that intuition has always come first and logic after. It is scarcely necessary to make reference here to the artist. Ruskin with his acute description of *theoria*, in *Modern Painters*, still stands out on the field.

As mathematical method comes to the fore in philosophy, it brings intuition back into its rightful place in that discipline.

The extent to which intuition is the guide for the mathematician may not be known to the layman, but he can inform himself readily by referring to the writings of Poincaré (his *Science and Method*) or to the remarks of Dr. George W. Birkhoff of Harvard, in his Presidential Address (1936) before the American Association for the Advancement of Science, on Reason and Intuition.

These are instances of acceptance of intuition in Bergson's and Whitehead's full sense of the term — not in the more limited meaning given by L. E. J. Brouwer, which will be found in its present form in *The Nature of Mathematics* by Max Black, in C. K. Ogden's International Library series. A clear identification of this latter meaning is given by Dr. Oliver L. Reiser in *The Promise of Scientific Humanism*, page 289. Because intuition in the full sense is to creative mathematicians a patent fact, we can find philosophy and religion (in the rational sense) joining the rest of the disciplines in the instance of a man like the Rt. Reverend Ernest William Barnes, Bishop of Birmingham.

The whole question of the actual reach and nature of Intuition now, however, comes forward afresh and urgently. On November 30, 1942, the American Society of Mechanical Engineers devoted the major part of its opening session in New York to intuition from the inventor's point of view. Dr. A. A. Potter, Dean of Engineering at Purdue University and Executive Director of the National Planning Commission, and Lawrence Langner, Secretary of the Inventors' Council, discussed interesting aspects of the subject. Allan Reginald Cullimore, president of the Newark College of Engineering in New Jersey, cited Henri Bergson's *Creative Evolution* on the creative instinct. "There are things [Bergson wrote] that intelligence alone is able to seek, but which by itself it will never find. These things instinct alone could find, but it will never seek them."

A principal speaker was Igor I. Sikorsky, of the Vought-Sikorsky Aircraft Company. He is widely known as the designer of an effective helicopter, which can rise vertically from a small landing-space and move in any direction without turning — a vehicle very simple to handle, that may become as common as the automobile. (May heaven help us if we have now to dodge traffic in three-and-a-half dimensions!) Mr. Sikorsky's subject was "Creative Engineering, Inventiveness and Intuition." We may cite pertinent passages from the *NEW YORK TIMES* report of December 1:

"Intuition may become a new faculty of mankind if properly developed by training. If and when developed, intuition will be superior to eyesight in a way in which this latter is superior to touching or smelling. As in the case of some other abilities, various individuals are differently endowed with the new faculty, but it can be ex-

panded and developed by training. Intuition appears to be some ability which permits an inventor, in a way not yet explained . . . , to "tune in" like a radio, and to learn, somehow, facts or laws that are not yet known, or to imagine and create a mechanism or part in correct accord with natural laws not yet discovered at the time of the invention. The phenomenon of the discovery of facts by intuition appears to be a reality despite man's inability to understand it." Mr. Sikorsky cited Jonathan Swift, Jules Verne and Leonardo da Vinci as . . . [cases in proof of the reality] of intuitive genius."

In 1931 the American Chemical Society conducted a questionnaire on "the hunch," which is the homely American form of the more elegant European "ripening of the unconscious." The questionnaire elicited two hundred replies describing how these men conceived the flash to come, and how they tried to create good conditions for solving a problem. Here we have what may be regarded as an inferior order of intuition. Ruskin's celebrated distinction between invention and creation comes to mind: carpentry and joinery as against architectural vision.

This is obviously psyche as anima as against psyche as real soul, animus. It is one thing to put pressure on a psyche through a problem of fitting together, and it is another to arouse insight. The test really is mere utility as against utility and beauty. Hence the supreme importance of the mathematician's testimony. For he experiences the tension and the relief, if successful; and also knows himself as creator.

The subject is important. Where, therefore, shall we seek for adequate discussion? In 1938 Cambridge University Press published a valuable book, *Intuition*, by K. W. Wild. Miss Wild modestly asserts she is no professional philosopher, but let no one be misled. She draws with acumen and skill upon Bergson, Spinoza, Croce, Whitehead, Jung, Lévy-Brühl, Wordsworth, Goethe, Marcus Aurelius and Rousseau, and traces this great theme from its roots in *instinct* (which of course has been abolished by psychological fiat) and in the *ripening of the unconscious*, to the lofty reaches of Boehme, Eucken and Plotinus. There is something especially convincing in seeing Dean Inge and Dr. Einstein in the same company. The reader recognises, because of the diversity of its possessors, the inescapable reality of intuition as a function of the soul in its own right.

Western writers unaware of the Sankhya-Yoga group of *darsanas* (the central two of six philosophical techniques which provide the cosmic outlook of India) are repeatedly entangled in unnecessary difficulties, in their efforts to identify intuition. The first of these difficulties arises from postponing a decision as to whether the mind-complex has any reality independent of the body. This is a question additional to notions of psychophysical parallelism and can scarcely be exaggerated in importance. Yet one of the most curious features of western thought is that few philosophers and psychologists know much of what evidence there is bearing on this topic.

The late William McDougall was one of these few, and his book, *Body and Mind*, stands apart as an achievement. If one asks psychiatric specialists whether they have ever read the cases reported in *Human Personality*

by F. W. H. Myers, their answer is almost uniformly negative. Discussion is therefore stultified, the facts being unknown to them. We point out this difficulty only because it has been decisively faced by Indian thinkers. George Boole was one of the few men in European thought who were familiar with the advantages which came to Hindus from such decisive thinking on the nature of man, which enabled the Hindu to create Algebra.

The second point is whether the mind-complex, under parallelism or any other aspect, is organic, as the body is. Even after all the work of Groddeck, Freud, Jung and others there is doubt. Why should we doubt it? It is clear that the body has great groups of organs, tissues and control apparatus. When we think of the vascular system, for instance, a well-defined entity is before us, with blood-stream, splanchnic pool, endocrines and a pumping and chemical plant of truly wondrous beauty and adaptability. Similar entities come to view when we think of the cortical system or the sympathetic system, or the amazing articulations of the bones, tendons and voluntary muscles, or the digestive system.

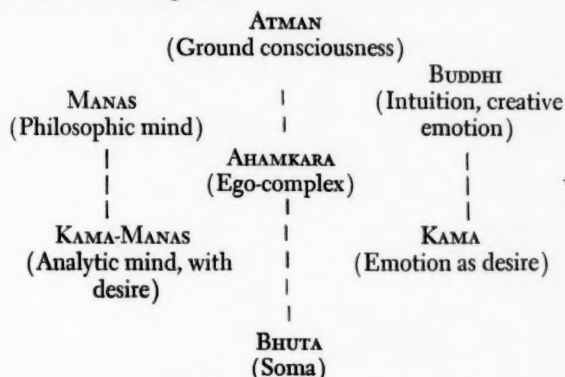
Now if mind is part and parcel of this, then mind can and must be conceded to be an organism. The more we emphasise in any view the reality of body and attribute a secondary character to mind, the more we must concede *organism* to mind.

But, curiously enough, the less we accentuate body and the more we lean toward primal reality of mind, the more conspicuous, also, become the organismic properties of mind. It is surely inescapable that mind is an organism, if organic features are admitted from one extreme of interpretation of it to the other. The psyche of man is thus elected to an organic state by both parties to the ancient argument between realists and idealists. This is a point of the highest importance, which again can hardly be found in western literature. The point has long been clear in the Sankhya.

Finally, just as it is clear on the place of intuition, Indian thought is decisive also as to the place and nature of consciousness. Consciousness is unitary in the individual, but it is an isolated monad only to outward seeming. In truth, consciousness is atomic precisely as the modern atom is a particle only from a certain point of view, and gets all its reality from the background. So it is with consciousness in the Indian concept.

For intuition the Sanskrit term *buddhi* is most suitable. If we were to interpret the Indian view of intuition in European terms, we should arrive at conceiving an organism in which the principal constituents are in pairs, a lower function of it inhering in the psyche (Freud) and a higher inhering in a soul, or animus (Jung), with ego central to them. Thus Indian thinkers have long ago recognised philosophical, or algebraic, mind; hence (we repeat) the remarkable advances made by them in algebraic thinking.

But the presence of critical, or analytic, mind is self-evident too. Thus we have two disciplines accounted for: philosophy and science. "But consciousness," says Whitehead (*The Philosophy of Alfred North Whitehead*, p. 681) "proceeds to a second order of abstractions whereby finite constituents of the actual thing are abstracted from that thing. This procedure is necessary for finite thought, though it weakens the sense of reality. It is the basis of science. The task of philosophy is to reverse this process and thus to exhibit the fusion of analysis with actuality. It follows that Philosophy is not a science." So much for two aspects of reason. Similarly emotion (*kama*) and intuition (*buddhi*) are sides of another shield providing organs in the mind which are preëminently suited to art and religion, yet useful also for sundry mundane affairs and occasions, just as mind is in both its aspects. Thus we have, in Indian thought, this sort of arrangement:



In its uncompromising monism Indian psychology also finds a place for vitality, but that is beyond our present discussion. The main point is that, by focussing our attention upon intuition, hunch, inventive mind and the rest, we restore to the scheme of things that which is required to bring the whole into balance; and we provide a basis for the fusing of the older philosophy and the newer science into an important element in world settlement.

In our recent efforts to bring disciplines of religion, science, philosophy and art into harmony with each other and thus to lay a ground for a democratic culture, we could profit fundamentally from giving some thought to all this. There is an old oriental figure of man (consciousness) as a rider in a chariot (body) which is pulled by two horses (mind and emotion). A better figure would be to consider the motive power to be something like the gas-engine. Both gasoline and spark are required to make the contraption go. Intuition is the ignition-coil which steps-up the battery-power of emotion, and it is also the timer. Without these indispensable devices, even an excellent machine, with plenty of factual intellectual motor-fuel passing through a good philosophic carburetor, can hardly go places.

F. K.

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WHAT IS INSIGHT or Intuition? Probably no two psychologists or philosophers would give the same definition. It is significant that in his article on *The Period of Creative Endeavour* (*Psychiatry*, May 1942) Eliot Dole Hutchinson does not attempt a definition but rather designates where intuition belongs. By addressing himself to intuition's place in the psychic scheme and its relation to other emotional and mental functions, Dr. Hutchinson achieves clarification of a subject that has long been obfuscating the minds not only of those to whom intuition is unimportant but also of those for whom intuition is of supreme importance.

This is the fourth, and presumably the last, of a series of articles dealing with insight and creative endeavour that have appeared in *Psychiatry* under this author's name. Each article outlines a phase or period in the cycle of activities involved in the production of creative work.

THE PERIOD OF PREPARATION involves "years of effort and a lifetime's acquisition of technical habits all centred upon some problem-situation which defines itself as it is pursued, if it is not already explicit. Large reaches of past experiences are requisitioned and form what is ordinarily called trial-and-error activity, that is: false starts on the basis of inadequate hypotheses, or sheer random effort in the face of apparently insoluble problems."

RENUNCIATION OR RECESSION is the phase "in which for a time the problem is given up in sheer defense of emotional balance; other activities, usually avocational, are interpolated. This period, involving as it does a large degree of frustration, is often characterised by rising emotional tone, restlessness, feelings of inferiority and, in the last analysis, temporary cessation. Mild psychoneurotic symptoms are common. It is usually some sudden stimulus from this whole field of irrelevance, when it comes into periods of slight mental pre-occupation and periods of rest, which terminates psychic tension and precipitates" the next phase.

A PERIOD — OR MOMENT — OF INSIGHT, "usually unpredictable in time, although determined by circumstances, is often accompanied by a flood of ideas, alternative hypotheses appearing in rapid succession, many of which are with difficulty made verbally explicit. Noteworthy in the experience are the almost hallucinatory vividness of the ideas, the emotional reaction, the feelings of exultation, adequacy, finality. The period is integrative, restorative, negating the symptoms of neurotic maladjustment engendered by the preceding period. The person steps-up to a new level of activity and to new possibilities of reaction."

Finally there is the PERIOD OF VERIFICATION, ELABORATION OR EVALUATION, "in which all technical and explicit rules of practice are again summoned into use and the possible exaggerations and overstatements of the period of insight are checked against external realities. Without such evaluation the insight does not release anything of communicable or of social value." Here we have the hard work, the drudgery, the systematic, exacting, continuous and largely uninspired

task of objectification. This demands a shift in mental attitude from the period of insight, which has probably been exciting and brilliant. Very often, because of the mental effort this involves, the goal is not realised. In order to complete the creative cycle of activity, however, the mind must pass through the period of insight and come all the way back to activity again. To stress how arduous and grinding this is, the creative struggles of painters, musicians, authors, poets and scientists are cited.

Because the period of insight is obviously not confined by exact time or duration, Dr. Hutchinson suggests that "it is sometimes better to consider the period of elaboration as coextensive, if not identical, with the original period of insight." How does the mental attitude make the required switch, from the preoccupation and insightful experience to the systematic and logical type of effort required for completion for the creative cycle? Dr. Hutchinson thinks these alternations exist because the creative mind is dynamic. Are these shifts possibly variations from a state of hypothetical neutrality? It is likely "that continual, although not regular, alternation is the rule so long as the creative impulse does not atrophy."

It is a significant fact that creative works, despite all the labour and criticism expended upon them, rarely measure up to the ideal projected at the moment of insight. Paradoxically, it is the lesser producer, the second-rate artist, who is the more likely to be satisfied with his work. Two reasons for this dissatisfaction are given: (1) with time for elaboration the ideal itself has been changing; (2) the imaginative conceptions as given in insight rarely correspond with reality.

We believe this leads to a very significant clue not pointed out: the importance that the psyche attaches (unconsciously) to the impressions of insight. As Dr. Hutchinson observes, it is the discrepancies between the perception in the moment of insight and the creative reality that arouse these feelings of dissatisfaction. But why should we have dissatisfaction, unless it be that we unconsciously attribute to our brief periods of insight a *greater authority* and a *greater reality* than we ascribe to those periods which precede and follow them?

Logicians usually object that no discipline of thought can give positive knowledge without that ready verifiability which is usually lacking in insight: "We will agree to dethrone the Goddess of Reason," says Will Durant, "if we are not asked to relight the candles before the Ikon of Intuition. Man exists by instinct and he progresses by intelligence." "Good and bad," says Bertrand Russell (*Mysticism and Logic*), "and even the higher good that mysticism finds everywhere, are the reflections of our own emotions upon other things, not part of the substance of things as they are in themselves."

Dr. Hutchinson criticizes the logicians for viewing the intuitive experience only in its illuminative stage rather than as a process of thought having several

stages which, after all, cover abundant contact with the outer world. It might not be amiss here to point out that ultra-mystics, such as Van der Leeuw, peculiarly enough side with the logicians in considering intuition only as an illuminative process. Where these two approving schools of thought differ is of course in that the mystic places all value on intuition, and the logicians none at all. Van der Leeuw (*The Conquest of Illusion*) tells us: "All that any man has ever thought of any worth in Philosophy he has thought as the result of intuition, not as the prodigious result of wearisome effort."

Van der Leeuw himself gives the example of Newton: What did all the years of cogitation amount to compared to that one sublime moment when the apple fell? The instant was all that mattered. An unrelated event? Newton apparently did not think so. Asked by a lady how he ever came to think of the

theory of gravitation, he answered: "By constantly thinking about it." (Period of Preparation.)

How communicable are insights? Dr. Hutchinson tells us: "They are not always communicable in words. Verbal imagery is only one of the doorways by which they enter consciousness. But one thing is certain: they are communicable only as expressed and are known only as objectified. Intimations of their existence may brush the cobwebs from the dusty surface of thought. But they are fully known only as they are acted upon, verified. As in all creation, it is hard to translate the truth gained into idioms understood by all. But, somehow, great minds are always able to do just that, leaving always a margin of the unexpressed or implied, which forces upon the observer himself the necessity of assuming a creative attitude toward the work. Herein lies the vitality of art, and the cutting edge of science." A.H.P.

THE HUMAN SOUL

"INSIDE EDEN" by Allan Devoe in the December issue of *TOMORROW* is an excellent piece of writing and merits especial notice as a penetrative study of the human soul. It deals with the well-known but seldom discussed problem as to what constitutes the difference in motivations of behaviour between animal and man. Is the difference a quantitative or a qualitative one?

Devoe postulates a substratum of the human soul that might be compared to Jung's *collective unconscious*. It is universally present in all living creatures and determines instinctual behaviour. But this "instinctive rhythm and life-gladness" of the animal, which knows not good or evil, is checked in its free flow in man by (Hindu) *manas*, mind. There is opposition, fight. The psychoanalysts call it repression. Question: Who represses?

We seem thus to be confronted with a duality in the human psychological fabric that does not exist in the animal; is much less noticeable in primitive tribes. Jung (*Psychological Types*), in opposition to Freud and Adler, clearly sees the necessity for assuming an

And Pre-Human Experiences

ego as the personal factor, since instinct is only an impersonal biological phenomenon. He views this ego as the result of individual differentiation; therefore, evidently, the end-product of multitudinous complexities of evolution.

Devoe's "Self" is quite concrete. "Once, in the millenniums of his pre-human evolution, man was wholly blood-brother to the other ingredients of the natural world: reflexively responsive, unselfconscious, all instinct and will-less acquiescence, kindred to the ichthyosaur and fern frond and knowledgelessly coalescing crystal. He was caught up in earth's orgiastic tides, unresisting as a mole or a cloud, obedient to his blood, participant in the great rhythms and rituals of which he had no comprehension . . . And then, in the moment of his acquisition of his humanity, there came the Self . . . A private self, knowledgeable and free of the old limitations which had held it to a course as will-less as the wheeling of the planets, stood proud in mastership, custodian of his own destiny. It was possible for man, when the old deep drives and urgencies and blood-commandments were felt in him, to cry out, willful to the universe: 'I will not serve!'" A.H.P.

CLARIFICATION BY HUXLEY

IN ITS ISSUE of December 14, 1942, *TIME* reported Julian Huxley's reply, published in December *Fortune*, to the four philosophical articles by four professors printed in Spring issues of the latter magazine. All four had expounded the view in one form or another that "the truce between religion and science has been based on the assumption of both most churchmen and most scientists that religion and science are separate realms, that the truth of God and the truth of the scientific world are complementary."

And a Challenge

Speaking professionally — that is, as a biologist — the grandson of "Darwin's great interpreter Thomas Huxley" wholly disagrees with and "directly challenges" those who try philosophically to reconcile science and religion. Presenting a coherent philosophy of man's object in life, he makes the flat assertions that:

"Body and soul are not separate entities but two aspects of one organisation . . . Matter and mind are two aspects of one reality."

"The supernatural is in part the region of the natural that has not been understood, in part an invention of human fantasy, in part the unknowable.

"Man must not attempt to put off any of his burden of responsibility on to the shoulders of outside powers."

"Mr. Huxley's answer to the argument that science is insufficient to man's needs and aspirations is to demand more science: 'When men assert that the scientific approach is incomplete it is because they have not been willing to follow it to its final conclusion, or because they are mistaking an early stage in its growth for full development.'

"Science began with the simpler phenomena; its first triumphs were in mechanics and simple physics; chemistry took another century. 'The central fact of biology, evolution, was not established until modern science had been in existence for over two hundred years . . . In the same way the science of mind developed later than biological science. What Newton was for mechanics and physics, and Darwin for biology, Freud was for psychology—the originator of a new and illuminating way of thinking.'

"Huxley flatly rejects the philosophic dualism which divides truth into two kinds: scientific and revealed. He declares that the world, living and lifeless, mental and physical, is composed of one stuff. 'In reproduction there is no moment at which life enters, . . . the offspring is merely a detached portion of the parental living substance.'

"Dualists have classically insisted that a dead man differs from a live one by the loss of a soul. But, says Huxley, a dead body is not the same as a living body, the chemical conditions are different: 'If you substitute oil for acid in the battery of your automobile, no current will pass.' The electric eel can light a lamp; less visible, but none the less real are the currents which accompany all vital activity. In the same manner, 'all the activities of the world-stuff are accompanied by mental as well as material happenings.'

"Evolution, gradual and continuous, was the bridge between matter and man. More important, scientifically, declares Huxley, is perception of the fact of evolutionary progress. Many species were mere diversifications; others trended toward specialisation which ran them into a dead end; a few evolved an all-around development (i.e., specialised in mind). It is this last develop-

ment which Biologist Huxley calls progress: 'It is concrete and measurable. It consists in an increased control by life over its environment, an increased independence to the changes of that environment, an increase of knowledge, of harmonious complexity and self-regulation.'

"Man remains not only the highest product of evolution but 'the sole repository of any possible future progress . . . With human consciousness, values and ideals appeared on earth for the first time . . . The quest for truth and knowledge, virtue, beauty and aesthetic expression, and its satisfaction through the channels of science and philosophy, mysticism and morality, literature and the arts, becomes one of the modes or avenues of evolutionary progress . . .

"Man is the only organism whose mind is so constructed that conflict is inevitable.' Holding high the contributions of Freud, Huxley defines repression as an adaptation to conflict. Undoubtedly the picture of human psychology given by psychoanalysis and other modern dynamic theories is crude and incomplete, but equally undoubtedly it is a first approximation to the truth.

"Its importance for philosophy and especially for ethics is enormous, for it enables us to understand how ethical and other values can be absolute in principle while remaining obstinately relative in practice; and, in conjunction with our knowledge of evolution, it enables us to reconcile absolutism and relativism by uniting them in the concept of right direction . . .

"Existing ethico-religious systems often contain a large element of psychological compensation: they compensate for the miseries of this world with the bliss of a world to come . . . for ignorance of fact with certitude of feeling . . . for imperfections of ethical practice by setting up impossible ethical ideals. This is not merely hypocrisy; it is a primitive method of self-defense.

"To become truly adult we must learn to bear the burden of incertitude.' With widened understanding of the reasons for man's fears and hopes, the biologist looks for radical changes in the upbringing of children, in methods of education, and in accepted religions and codes of ethics. 'The most difficult lesson to learn is that irrational and intolerant certitude is undesirable . . . but it must be learned if we are to emerge from psychological barbarism.'

RECENT ITEMS

Bird Migration

ACCORDING TO DR. ALBERT WOLFSON, University of California zoologist, "extra measures of bright light and glandular development cause birds to migrate northward." Dr. Wolfson tricked several Oregon juncos, sparrow-like birds which winter in California, into flying northward months ahead of their normal time for migration. He exposed these birds to long periods of artificial light, and this set into motion a complicated physiological process which developed the urge to mi-

grate. As the birds absorbed increasing amounts of light, Dr. Wolfson observed a quickening in their endocrine glands, particularly in the pituitary and sex glands. In that condition the glands secreted extra amounts of hormones, which caused changes in the bird physique.

One of these changes was the appearance of a layer of fat which, Dr. Wolfson says, constitutes a reserve fuel-supply for long flight. There was also a complex

change in the nervous system which produced the desire to take off for a long "hop."

Dr. Wolfson concluded that natural causes of northward migration thus must be the influence of the lengthening days of Spring, their extra sunlight serving to start the extra gland-activity. Apparently these changes take place only in migratory birds. Dr. Wolfson tried the experiment on non-migrating juncos without producing any fly-away tendencies. Still unsolved is how the birds know which direction to take and how far to go. (Vancouver Province News, July 10, 1942.)

Life in Unknown Climes

IN THE EXTREMELY wide range of physical conditions found in the astronomical universe, it is possible that life might exist in a much wider variety of forms than is found on earth. Thus we may consider (a) the extent to which similarities and differences of structures might be expected if life essentially like that on earth should occur elsewhere; (b) the extent to which a different distribution of elements or compounds would leave life still possible, and the differences of organisation that might be correlated with such differences in distribution; (c) the possibility of a totally different chemical basis of life. This last possibility is based upon the definition of life as any organisation of chemical structures which tends to reproduce itself on earth arising from the virus. A set of conditions under which this extended nature of life might exist has certain limits of chemical composition, temperature, pressure, physical state, energy and variation. (Reference: L. J. Lafleur, Brooklyn College. Theoretical Biochemistry. *Acta Biotheoretica* 5(4):177-183. 1941)

Rubber-Like Protoplasm

"PROTOPLASM, the material basis of life, seems to have a rubber-like structure; unlike rubber, however, it does its own stretching and contracting.

"This viscid, ceaselessly pulsating and streaming stuff that is the 'alive' part of all cells seems, on the basis of evidence now on hand, to be a structure of overlapping, parallel, submicroscopic fibres, with minute gaps between their ends. This resembles the theoretical structure of rubber.

"The ceaseless, pulsating stretch and contraction that we see in the beating heart and breathing muscles, runs throughout the whole living world down to the primitive organisms known as slime-molds, which are naked masses of protoplasm.

"These points were made in a symposium on the 'Structure of Protoplasm' edited by Professor William Seifritz of the University of Pennsylvania." (*Science News Letter* 41,364, June 6, 1942)

Crying as Medicine

"YOU HAVE KNOWN that weeping will relieve tense emotions, but many doctors say it will help some physical ills," says Leonard Wallace Robinson in *YOUR LIFE* (September 1942). "If you can, try weeping the next

time you have a head-cold; it may clear it in an hour or two. Such cure through crying may not be due to an emotional release but to the action of a powerful antibacterial lysozyme which is contained in tears and which may kill the cold germs in nasal passages and membranes.

"A Chicago physician sends head-cold cases to the weepiest 'movies' in town, advising them to weep freely. Many cases have been cleared up, he reports, during a good, tear-jerking double-feature. Such news gives support to the old-fashioned remedy of stringing onions around the neck of cold-sufferers."

Growth, Mind and Electricity

AN INTERESTING DEVELOPMENT of studies of fluctuations of electrical energy during plant growth is reported in the *Yale Journal of Biology and Medicine* (August 1942) by Dr. Harold S. Burr, Anatomy Professor at Yale. When internal structural changes are taking place in growing corn, the voltage changes, "curiously like brain-waves in animals." The record of current-oscillations was accompanied by motion-pictures of growth, and the fluctuations turn out to be regular and rhythmic, the impulses ranging around one two-thousandth of a volt. The use of relays to record such low voltages reminds us of the electron-microscope. With the appearance in the *Journal of Biological Chemistry* of the first pictures of the tobacco mosaic virus (April 1941), it became possible to observe directly, for the first time, living organisms which approximate molecules in size.

Upon each extension of the frontier of knowledge through such uses of electrical waves, there is usually a suggestion that we are on the verge of being able to describe life- and even mind-processes in electromagnetic terms. Of course this is all very premature. It is one thing for internal structural changes to be accompanied by electrical currents, and another for those changes to be nothing but activities of electrical charges. Sir Charles Sherrington, in *Man on His Nature* (Macmillan, 1941), pursues in effect the animistic argument. He holds the brain to be an organ of liaison between energy and mind, but not a converter of energy into mind or vice versa — which requires us to attribute mind to lower organisms, how far down the scale being very debateable. But such beliefs do not explain consciousness. And until unequivocal evidence is at hand which reduces the whole account of some organism to electromagnetics, the safest assumption is that which accords with observed fact, to wit: that energy, life and consciousness display quite different properties. In other words, their unity is at a level well beyond present powers of observation. F.K.

Doing, Saying and Thinking

MASS OBSERVATION (British equivalent of a Gallup Poll) reports on "Home Propaganda," in *Change*, 1942, No. 2, explaining official propaganda addressed to the people of Great Britain since the beginning of the war. It deals mainly with posters, leaflets and press-campaigns; but the effects of radio, films, lectures, and

meetings are also discussed. It emphasizes the fact that what people do in response to propaganda is often different from what they say they think about it, and is much more important. The data were obtained partly from questionnaires given verbally to groups of people in different parts of the country, and partly from observations made and reported by "Mass Observation's nationwide panel of voluntary informants." The findings show that most official propaganda has been inept and inefficient. Appeals to citizens should be far fewer, less diffuse, and less mutually conflicting; they should be much more clearly and simply stated; official leaders should as far as possible instruct the citizen in what he is to do, and why, rather than plead with him to do it.

Psychological Abstracts (November 1942) considers this study of especial value at the present time. It shows that the people of a democratic nation at war realise, far more than does their government, that aggressive leadership is essential. This tallies pretty well with what many shrewd observers here have been saying for some time, to wit: that the people want to be told what to do, not asked.

Another interesting revelation is that what people say they think about any piece of publicity does not always correspond with their actual response to it. This finding has its roots in the psychological truism that the average person cannot be both actor and critic at the same time. By way of example: A survey taken by Boston University students undertook to discover what Boston housewives thought about sale advertising and comparative prices. Nine out of ten said they did not believe in "comparative price" advertising. This is probably true but relatively unimportant, because the fact is that, while a woman may not "believe" that those dresses advertised for sale at \$5.00 represent values "up to \$10.00," she does hope that there will be some, say, \$7.50 values among them (which she, the wise shopper, will quickly discover). So, while not "believing," she nevertheless acts.

Surveys that, in effect, ask people to criticise their own reactions are usually unreliable. The Gallup Poll has proved successful because it generally confines its questions to what people think of current public affairs.

A.H.P.

Mechanical Memory

A DISCOVERY that may explain the mystery of memory as a reaction between molecules and ions of different sizes has revealed what lies behind a long-known but puzzling action of rubber and glass. This property was found to be so striking that it was called a "mechanical memory."

If rubber is twisted in one direction and held so about an hour, it afterward will try to twist itself in that same direction; even after being twisted in the opposition direction.

Glass can be made to "remember" the direction of an electric current so that afterward it prefers to conduct electricity in the "remembered" direction.

The explanation, reported to the American Ceramic Society by Dr. Nelson W. Taylor, head of the Cer-

amics Department of Pennsylvania State College, lies in the fact that the larger molecules and ions in rubber and glass require a longer time to react than the smaller ones do.

Furthermore, the molecules and ions appear to act independently of each other. They react both with different speeds and in different directions, according to the difference of their sizes. The result is that one direction will become the easiest if the inert materials are held long enough in one fixation. That easiest way then becomes the "mechanical memory."

Memory in Microorganisms

HERE IS AN ANSWER to Grabowski's objections to F. Bramstedt's previous work on the formation of associations on ciliate Protozoa. Grabowski found that chemical differences might arise between the two halves of the slides on which ciliates were "trained" to associate two factors or one factor with punishment, and that the animals really responded to such differences, since an untrained animal would turn back at the previous boundary of the two conditions just as a trained one would. Bramstedt failed to substantiate this result and claims that his results remain unaltered if the water of the two halves of the slide be mixed by stirring; also that if conditions (i.e., illumination) in the test-trials are reversed from what they were during the training, the animals continue to react to the conditions to which they have been trained. Bramstedt reiterates his previous finding that *Paramecium* can remember the shape of a container and continue to swim in a path resembling that shape when removed to a container of different shape. Grabowski's supporters maintain that the results indicate an increased sensitivity to the factors involved (e.g., light) rather than learning. (L. H. Hyman, in *Biological Abstracts*, January 1941, reporting *Ueber die Dressurfähigkeit Ciliaten*. F. Bramstedt. *Zool. Anz. Suppl., Verhandl. deutsch. zool. Ges.* 41, 12:111-132, 1939.)

Sikorsky's Dream

IN HIS BOOK, *The Story of the Winged-S* (Dodd, Mead), Igor Sikorsky tells this significant story:

"When I was about 11 years old, I had a wonderful dream: I saw myself walking slowly along a narrow, luxuriously decorated passageway, on both sides of which were walnut doors similar to stateroom doors on a steamer. A spherical electric light from the ceiling produced a pleasant bluish illumination. I felt a slight vibration under my feet, different from that of a steamer or a railway-train. It didn't seem strange to me in my dream that I was travelling on a large flying-ship, although at that time no such thing existed.

"Over 30 years later, in 1931, Sikorsky Aircraft delivered the first American Clipper to Pan-American Airways. I had test-piloted this plane before it was furnished and decorated, and now Pan-American officials invited me to accompany them on a flight over New York.

"I sat comfortably in the front cabin, watching the city in the setting sun. As it grew dark, I decided to see

what was going on in the rear. While I was walking toward the smoking-lounge, the steward turned on the lights. I stopped in astonishment. I realised that I had seen all this a long time ago — the passageway, the bluish lights, the walnut doors and walls, the elegant entrance to the lounge. Finally I remembered my childhood dream.

"It was the same scene in every detail."

Fatigue and Sleep

CARRYING ON BRAIN-BIOELECTRICAL INVESTIGATIONS, Grüttner and Bonkalo report in *Archive der Psychiatrie*, (1940, 111, 652-665) that, in fatigue, alpha-waves from the brain become irregular and discontinuous. Before the sleep-onset a reduction of normal cortical activity is observable, but a considerable reduction of activity through fatigue does not necessarily lead to sleep. During sleep, the cortex is, at least at times, very active. This activity, however, differs from that of the waking-state. During sleep, frontal activity is greater

than occipital, while the reverse holds true during waking. (H. L. Ansbacher, *Psychological Abstracts*, November 1942.) A.H.P.

The Psyche in Biology

"THE PROBLEM of this dissertation is the differentiation between living and material things. Most of the work is devoted to a critical summary of the various approaches to the problem. The author discusses briefly mechanical biology, emergent evolution, and holism. The conception of a living organism, which he himself prefers, is that of a hierarchy of monads in which physical and psychical activities, though connected with each other, are radically different. 'The psychical factor in the life organisms is of their very essence, and throughout the scale of organic evolution it has become of increasing efficiency.' — F. W. Finger (in *Psychological Abstracts*, commenting on *The Riddle of Life: a survey of theories*, by W. McDougall. 279 p. Methuen: London, 1939. 7/6.)

MIND DIMENSIONS

THERE IS A REMARKABLE article on Photographic Analysis by M. Leo Katz in the current issue (no. 43) of *The Complete Photographer* (Willard D. Morgan, general editor, published by The National Educational Alliance, Inc., 4600 Diversey Avenue, Chicago). Mr. Katz discusses levels of consciousness, the diameter of the mental world, beauty, absolute beauty (in Plato's sense), mental dimensions and the like. This is no mere bookishness and its authority derives from experience full and overflowing. Some sense of the quality of the writing will be found in this passage (page 2770) from the section dealing with the Diameter of the Mental World:

"Another neglected angle of importance is the photographer's conscious or subconscious relation to the world. Every man lives in a certain world the diameter of which depends on his individual mental calibre. People with a small diameter are conscious only of themselves. Whatever part of the 'non-I' world they contact, they project on their 'I-centre,' to be exploited for their own ego or to be ignored.

"Other individuals have a more collective consciousness. They can think as a part of a group, family, clan, tribe, nation, state, class, race, or of all humanity. We are individuals, we are members of smaller and larger groups; the whole human race is a part of terrestrial nature. The earth is a part of the solar system, which in turn is a part of the Milky Way . . . a Universe among innumerable other Universes in the cosmic space. More miraculous than the vastness of these systems seems the fact that human minds are able to relate themselves to the different parts of the world. All men, regardless of . . . [the] diameter of . . . [their] consciousness, are children of terrestrial and cosmic

And Absolute Beauty

. . . [Nature]. There isn't a thing anyone can do about that, and no one can step outside of any of those units as an independent, self-sufficient being. No manner of life or death can separate us from the universal whole or from terrestrial nature and human heritage.

"The limitations of our mental machine determine how far our conscious behaviour can do justice to those unalterable facts and how far our intellect can grasp them . . . A curious light on our situation . . . [is] that those who think according to these facts are called dreamers, and those who act as if they lived in a small fictitious world with their little ego as centre, call themselves realists."

In the passage on Mental Dimensionalities (page 2777) Mr. Katz writes, with rare acumen, of one-dimensional minds (who string their facts) and two-dimensional minds (like card-indexes). "As a final addition, we have to recognise a rare type. While in the preceding models the conscious centre is able to reflect, like a mirror, previously recorded impressions, isolated or connected ones, this sixth type has a centre capable of the same reflecting-power plus the ability to conceive sparks previously not recorded and to project them into hitherto dark parts of the globe.

"Also, what we called 'plus-dimensional' or 'psycho-dimensional' . . . seems rather inadequate, though modern psychologists are trying hard to reduce the whole phenomenon usually called genius to a case of greater intensity or efficiency of deduction, without considering any dimensional side to the problem. We have to call it perhaps a multi-dimensional type with creative intuition, the nearest type to multi-dimensional life with its contradictions and its complete lack of bead-string logic and filing-card rationality.

"Only here could we speak of a real mental power with dynamic currents or waves of lightning speed, disregarding space limitations and outracing time prophetically on higher levels of consciousness. Combine this picture with our previously-mentioned consciousness of cosmic diameter and you have the Promethean geniuses of all ages: those who bring the sparks of higher life, often in exchange for crucifixion; those giants of the mind who, like antennæ, receive ideas from a world outside the little demands of the ego, or, as Kant put it, 'those individuals through whom nature dictates its laws to humanity.'

"Beauty born by those dynamos is often sharp as lightning, full of what William Blake called 'the Thunder of Thought.' It has the exclusive strength of the 'status nascendi' known in chemistry. One- and two-dimensional minds like order and beauty too, but they like it nice, harmless, soothing, cute and thin or brutally vulgar. Any multi-dimensional embrace pushes them beyond their strings and cards where they suffocate like fish out of water . . .

FACIAL ASYMMETRY

AMONG THE MANY ITEMS which must be assessed afresh in terms of modern ideas, especially of the space-time matrix, none is more curious and interesting than the relationship of the right and left halves of the human face and form, which comes to the fore through a discussion in *Forsch. Fortschr.*, 16, 361-363, 1940, reported all too briefly in *PSYCHOLOGICAL ABSTRACTS*, November 1942, by H. L. Ansbacher, Brown University. We regret that under present circumstances we cannot report from the original. In the next paragraph we record the chief points made in the abstract.

The writer, M. de Crinis, examines the clinical significance of human facial expression and especially the relationship of the brain-cortex (grey matter and its correlates) to facial dis-symmetry. He points out that in a great many people the left side of the face dominates, and that this side of the face is associated with the emotions — broadly, let us say, with the psyche as a whole. The cortical aspects, which are related to the animus or superior psyche, are primarily expressed in the right side. Many diseases give the face a characteristic expression through variations of facial asymmetry. Serious intestinal and tubercular diseases can be diagnosed in part through this symptomatic approach.

The degree of dextral-sinistral asymmetry in humans, in contrast with that of higher animals, has been remarked since very ancient times. Indeed, the terms *dexter* and *sinister* are derived from psychological meanings given to this phenomenon by the thinkers of antiquity. Until now no intelligent interpretation of this fact could be offered, although data of various kinds have accumulated. It is still held, despite the indeterminate nature of the work done to date, that repressed left-handedness leads to stammering, in aggravated cases. Thus, the deep psychological import of right and left and the meaning of the decussation

"Therefore, before asking what is beauty, what is strength, what is character, what is composition — analyse yourself: What is your mental diameter? To which . . . dimensional [type of] mind do you belong? Are you thinking . . . [arithmetically] or creatively? Are you a string, a card, a globe-mind . . .? How much do you take for granted? How much do you take from others? How much is your own contribution in your work? How many ideas of your own have you had? Do you feed entirely on the past? Do you experience the present vitally? Are you thinking of and for the future? How much of your success is earned, due to your own effort, how much is [due to] annexation and exploitation? How much is due to a good quiz-memory, how much is understood, and how much of your result is accidental? Are you bragging about equipment you have bought from dealers, with dollars, believing that that makes it yours? Do you think you can buy progress, invention, and beauty . . . and call it your own? What kind of world is your life a part of, not as audience but as participant? Are you greedy about success or are you in love with your work?"

Editorial Summary

(crossing over) of the nerves is apparent. The interpretation is that since the left arm goes with the right side of the brain, and the right arm with the left hemisphere, when a natural tendency to left-handedness is well-developed, repression of it may lead to a major catastrophe.

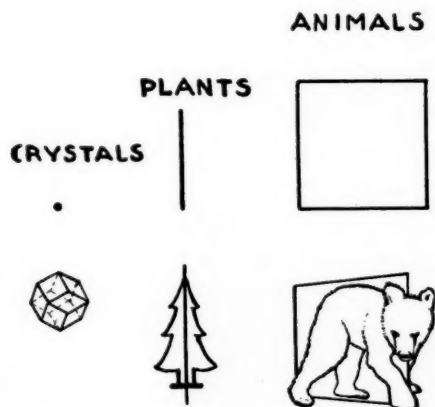
The most recent thorough studies of facial symmetries were made by M. Pierre Abraham and reported to a meeting of the *Société de Psychologie* on January 18, 1934 at the Sorbonne and published in the July-October issue of the *Journal de Psychologie Normale et Pathologique* the same year. M. Abraham calls the dextral person the *intimate man* or *inner personality* (corresponding to Jung's *animus*), and the sinistral person the *social* or *contact being* (Jung's *anima*). The latter is associated with the right hand, which in most people is the leading hand. The former is connected with the left hand, the supporting hand.

The Abraham studies are supported by admirable anthropological data, including artistic materials, and are sensitively interpreted without imaginative and irrational interpolations. This point is important. For in every case of subject-matter such as this, where the data is small and the modern philosophical treatment inadequate, where artistic insight must come into play in the way in which a good physician's diagnostic sense is aided by art in absence of decisive clinical evidence, the character of the interpreter determines whether the result will be sense or phantasy.

So much for the data at this time. Turning now to the reinterpretation of the materials in terms of modern concepts, we find an instance which is of highest importance, for it shows how realistic use and full acceptance of ideas of the space-time matrix enable us to reevaluate older notions. Under present circumstances the reference to the geometry of the situation

must be kept simple. It may indeed appear naïve, particularly as the facial asymmetry is here discussed without reference to the two other dis-symmetries of the human body. Reference to the grand display of symmetries in the various kingdoms of Nature must here also be severely restricted.

Yet we may point out that the three kingdoms of Nature display three types of symmetry, as shown. The crystal, it is true, does not often show a point-symmetry in Nature, on account of the circumstances of accretion from its fluid matrix. But the crystal formed under ideal conditions tends to display point-symmetry. Again, plants do not achieve symmetry around the growth-axis except under very special, and in protected, conditions, and even then only partly. It is only the compound plant, too, and especially the great examples of plant evolution — the trees — with which we associate almost invariably a central axis. (To attribute axial plant symmetry to gravitational forces is beside the present point. Gravity in this case is as much a



Ideal simplification of the symmetries of the three kingdoms of nature. (Drawing by J. D.)

part of the environment as the crowding of crystals in the mother-liquor is. We must focus our attention on the innate character of the best species in each kingdom.)

In the case of animals to do this is particularly important, for that vast kingdom displays an amazing variety of symmetries, as we see if we run over in our minds the forms of star-fish, worms and snails. Again, in the highest evolutionary examples, however, particularly in the vertebrates and especially the warm-blooded creatures (above all, the mammals), symmetry to a plane (bilateral symmetry) is the conspicuous feature. This of course has a practical aspect, the utility of such symmetry for locomotion being obvious in the quadruped and biped.

But, turning to the psychological side of the question, we find an interesting fact: the animal, which shows no sign of that internal conflict which is appar-

ent in the human psyche and associated with the appearance of self-consciousness, has a very high degree of symmetry both in face and form. It seems very evident therefore that the high degree of dis-symmetry in man has genuine psychological significance. There are two mighty pairs of opposites at work within each of us.



If crystal centro-symmetry be determined by three (or more) planes meeting at a point, the linear plant axis may be treated as above. (Drawing by A. J. G.)

If we regard the space-time manifold as a series of intersecting planes, then the crystal point-symmetry arises from three spatial planes. In the case of plants, we may conceive one of these planes as supplanted by a time-element associated with plant growth. When we



The developed animal's bilateral symmetry. In this case two space-planes are replaced in the concept by growth and mobility. (Drawing by A. J. G.)

pass to the superior animals, where locomotion (a new time-element) comes into play, still another space-plane drops away, and we have instead both growth and locomotion. Man resembles the higher animals organically, even somatically, but he walks upright, and has this bilateral dis-symmetry and highly specialised

extremities. So that we may say in man the last space-plane recedes into the background, and a new situation obtains outwardly. Inwardly there is also a new psychological event, namely: the emergence of self-consciousness; and a new relation to time: true memory.

The halves of the human face may be split apart in photographs, and two lefts and two rights joined. When this is done, the feature which we call character is completely altered. One of the finest examples from



the Abraham series is the case of George Sand, where the dissimilarity, between the woman who loved and would have cherished Chopin and the woman who consumed his life, is perfectly evident. It seems pretty certain that along these lines a biological and also

a psychological interpretation of the meaning in Nature of the space-time manifold will be discovered when the appropriate group of experts can be assembled to work upon such a major project.
F.K.



GEORGE SAND

Above: Two left halves of the subject joined.



On left: Two right halves of the same subject joined.

(From Abraham.)

A PHILOSOPHICAL SERIES

WITH THE PUBLICATION of *The Philosophy of Alfred North Whitehead*, it has become completely clear that the Library of Living Philosophers is of the highest value. The series is published by Northwestern University and edited by Dr. Paul Arthur Schilpp of that institution's department of philosophy. The first book in the group was devoted appropriately to John Dewey and appeared (1939) before the inception of MAIN CURRENTS. So did the second, in which George Santayana was interpreted (1940). Following the present volume on Whitehead we are to have Benedetto Croce, G. E. Moore, Bertrand Russell, Ernst Cassirer and Leon Brunschvig.

The idea is unique. While the philosopher is alive his chief contemporaries discuss and interrogate him and he replies. What is more, and of the greatest importance to-day, specialists in various fields of science or art or religion discuss the man's concepts as bearing on the specialty. An autobiography and a portrait come first and a complete bibliography comes at the end of each volume. The format is handsome. Best of all, the treatment is direct and mercifully free of pedantry, although of course the technical language of philosophers is employed, by necessity. May Dr. Schilpp live long; may we never run out of philosophers; and may the present writer still be on hand if Albert Einstein is brought into the compass of the series. Most of all, may the editor and his colleagues have the wit to determine wisely who is great while the man lives!

We propose to notice the volume before us in a way that seems to us to suit the whole undertaking. We extract representative passages, instead of attempting the impossible task of summarising summaries. We are, in any case, too near Whitehead in time. When we are sufficiently far removed from even the greatest sage or seer the disparity of stature between him and ourselves is compensated by the interval, as a mountain's

Notable for its New Approach

general contour is clear from a remote distance at a cost in detail. Even a mountain of great height is brought to mind so well by its simple name that we can recall its principal slopes, if they have been often seen and much loved — Jungfrau, Ranier, Gauri Shankar. So also a Buddha's life and teaching can be summarised in a single word, Nirvana. With Plato we say Idea; with Leibnitz we think of Monad. As we get into more recent times, and say, perhaps, Bergson, the single word is less certain — vitality, intuition, creative evolution?

One thus runs very great risks with contemporaries (hence the worth of a volume like this), for we put our own name on the man. Even when he speaks for himself there may still be doubt. Do we mean what he does by the word or words which seem to characterise his views?

In the case of this spacious, calm, impersonal yet very human subject, Alfred North Whitehead, there is a word, nevertheless, which comes forward over and over. That word is *organism*. It is true that from sheer living, and from Bergson, and from his happiness in family life, Whitehead is rich in intuition, as to method. His unusually balanced experience with mathematics and classics alike has given him means to keep old and new together. Then there is the essential quality of wisdom and wonder behind the brilliance and humour. Above all, we see courage and intellectual integrity. These in varying degrees are found in all true philosophers. But here we have a remarkable balance and from this — the whole courageous, sane, generous man — we get the sense of a universe seen as an organic whole, because the perceiver is that himself: an organic whole — "a man in the midst" looking upward and inward, and downward and outward. That is why *organism* is no mere word, in this case.

Our knowledge of the universe as an organism is not

as yet well enough advanced to justify Whitehead's insight, perhaps. But the concepts will surely endure just because the perception is of that which is inward (and yet to come) as well as outward (and hence evi-

dent already). The only mystery about Mr. Whitehead is how a man so charged with life and consciousness could ever have participated in writing *Principia Mathematica*! F.K.

THE PHILOSOPHY OF ALFRED NORTH WHITEHEAD, Edited by Paul Arthur Schilpp, Northwestern University, 1941, Volume III in The Library of Living Philosophers, 745 pages, \$4.

THE SIGNIFICANCE OF WHITEHEAD TO BIOLOGY

Extracts

IT IS NOTEWORTHY that the two papers at the end of this volume, from Mr. Whitehead himself, are upon Mathematics and the Good, and Immortality. Thus, at the age of eighty, a mature mind comes back to what surely must be admitted to be most central Platonic doctrine. The papers do not purport to be comment on the discussion which goes before. Mr. Whitehead was not well enough to do more than give this venture his approval and the editor his thanks, and indicate that these two recent addresses might serve as epilogue.

Perhaps the most interesting passages in the discussion among so much that is of highest value are the remarks of the biologist Joseph Needham, of Cambridge University, who was called in to provide *A Biologist's View of Whitehead*. It is a paper, this, well worth reading several times, and is appropriately put in the very centre of the book. Indeed here we have the peak of the argument, and fine extracts from Whitehead himself. Pertinent passages will indicate immediately the overwhelming importance of biological thinking and social movements. In the passages from Mr. Needham, which follow, the term *dialectical materialism* will often be nearly equivalent to the Greek idea: Nature is reasonable.

We quote: "The basically important fact that social evolution must be regarded as continuous with biological evolution was appreciated by Herbert Spencer and Auguste Comte, who in this respect, though not of course in others, made an approach to the organic conception of the world. It has the extremely important corollary that any static or too conservative view of the present position of human institutions becomes impossible. If living organisation has such triumphs behind it as the first invention of the cell-membrane, the kidney-tubule, the notochord, the flint-knife and the plough, the art of language and the skill of ships, it is not likely that the agreements of Ottawa or Munich have any durable importance, or that human society will always remain separated into states with national sovereignties above the moral law, and social classes with different privileges and manners. This has generally been appreciated by upholders of the organic view of the world, but much more boldly by Marx and Engels, for instance, than by Smuts or Lloyd-Morgan.

"It is probable, indeed, that the organic view of the world has considerable historical and social significance. The seventeenth century, the age of Gassendi and Newton, of Boyle and Descartes, was a time in which

the capitalist system of economic individualism won its first decisive victories in taking over state power. The surrender of the last royalist troops in the English civil war was the final conclusion of centuries of feudalism, for though the monarchy was restored in England, feudalism was not. All later monarchs ruled by the grace of the City of London. Parallel with the breaking-up of the old guilds, and the absolute freeing of commercial enterprise in every kind of new exploitation, went the re-discovery of atomism by Gassendi and its application to chemistry as the 'corpuscularian or mechanical hypothesis' by Boyle. The analogy between free merchants, projectors, and industrialists, and the fortuitous concourse of atoms, can even be found explicitly stated in seventeenth century books on economics.

"Is it not therefore of interest that in our time, when capitalist economics has worked itself through to a new state of society demanding everywhere more social control and organisation of human affairs, that there should be a rediscovery of the organic interpretation of the world, an interpretation in which the molecules 'do not blindly run,' in Whitehead's famous phrase, but run in accordance with the whole of which they form a part? Function depends on the position of the whole. Statistical regularity of fortuitous random motions is not the whole story; there is a plan of organising relations, too. The world is not entirely like a perfect gas or an absolutely homogeneous solid, it also contains viscous phases, crystals rigid in one, two, or three dimensions, plasticity, and elastic deformability, living organisation. It may be that we are on the threshold of a long period, lasting perhaps for several centuries, in which the organic conception of the world will transform society, giving it a unity more comradely and equal than feudalism, but less chaotic and self-contradictory than the centuries of capitalist atomism. In Alfred North Whitehead we surely have to recognise the greatest living philosopher of the organic movement in philosophy and science."

Following appreciative reference to Coleridge's essay "The Theory of Life," published in 1848, Mr. Needham goes on: "More important, some decades later, was the work of the London philosopher, Karl Marx, and the Manchester business man Frederick Engels. The views of the latter on scientific theory have in recent times become generally recognised as having been far in advance of his age. The author would disclaim any competence for presenting the contributions of

these great thinkers as they deserve, but there are numerous handbooks which may be consulted, a process which is in this case especially necessary as the views of these men on political subjects, then unorthodox, caused them to be somewhat boycotted in academic circles. Marx and Engels were of course profoundly influenced by Hegel, just as Coleridge had been. But whereas he tended to retain Hegel's metaphysical idealism, they 'turned it right side up' and, while keeping Hegel's dialectical account of change and process, in which a synthesis arises out of the deadlock of the thesis and the antithesis, they adopted a realist metaphysics.

"Their materialism, however, was to be known as 'dialectical materialism' as opposed to the old mechanical materialism, in order to show its naturalistic character, its determination to account for all the highest phenomena of mind and social organisation, without leaving the firm basis of the real objective existence of matter. Something of this kind was meant by Marx's saying that materialism must cease to be 'ascetic.' Of course, the only way in which such a naturalism could account for the highest phenomena of mind and social organisation, love and comradeship, justice and mercy, was by admitting a series of levels of organisation, arranged in the successions and envelopes of which we have already spoken.

"And so from this standpoint also there came a doctrine of levels of organisation. It had, however, the cardinal virtue, which not many other naturalisms have had, of emphasising the transitory character of human institutions. It showed that evolution of social systems continued from that of biological systems, and urged the optimistic but tolerably convincing view that human misery is essentially connected with a low and inferior stage of social organisation, that it had in the past been much worse than it is now, and that in the future it ought to be greatly decreased.

"This is not the place to discuss Marx's theory of history, but if history is the history of class-struggles (and to some extent it undeniably is), there is room for hope that when mankind has united in a world coöperative commonwealth unmarked by social classes, a good many of the more unpleasant features of life in a semi-barbarous state will have ceased to exist. And indeed this is not a hope at all, but a faith based on that guiding thread of rise in level of organisation, which we have seen running throughout the evolution of our world; and hence a scientific faith. It was for this reason that the kind of socialism advocated by Marx and Engels received the name which it bears to this day, 'scientific' socialism, as opposed to the Utopian varieties, which based their hopes only on the goodness of human nature or similar more or less reliable factors.

"Dialectical materialism has been called the theory of transformations, of the way in which the qualitatively new arises, of the nature of change in the natural world. Its outcome in biology — to return to our main theme — was certainly beneficial. In 1931 a Russian biologist, B. Zavodovsky, wrote for an English symposium as follows: 'The true task of scientific research,

is not the violent identification of the biological and the physical, but the discovery of the qualitatively specific controlling principles which characterise the main features of every phenomenon, and the finding of methods of research appropriate to the phenomena studied . . . It is necessary to renounce both the simplified reduction of some sciences to others, and also the sharp demarcation between the physical, biological, and socio-historical sciences . . . Biological phenomena, historically connected with physical phenomena in inorganic nature, are none the less not only not reducible to physico-chemical or mechanical laws, but within their own limits display different and qualitatively distinct laws. But biological laws do not in the least lose thereby their material quality and cognisability, requiring only in each case methods of investigation appropriate to the phenomena studied.'

"A few years later there was an equally good statement from a French biologist, professor of zoölogy at the Sorbonne. Marcel Prenant wrote: 'In biology dialectical materialism is opposed both to vitalism and to mechanical materialism, which are both really metaphysical theories. He refuses to make a sharp distinction between the physical and biological sciences, to reserve causal determinism to the former and to appeal to teleology in the latter. But neither does he suppose that biology must try to reduce itself to the physical sciences. He affirms the unity of the world, in which neither life nor human society constitute domains apart, but he also affirms that this unity expresses itself in qualitatively different forms of whose distinctive characters one should never lose sight.'

"Dialectical materialism has been perhaps more successful in emphasising the existence of the levels of organisation than in elucidating the dialectical character of the transitions between them. There have, however, been some interesting suggestions. J. D. Bernal has pointed out that natural processes are never 100% efficient. Besides the main process or reaction, there are always residual processes or side-reactions, which, if cyclic or if adjuvant to the main reaction, will not matter very much. But they may be opposing and cumulative, so that after some time a new situation will arise in which such opposing processes may make an antithesis to the main reaction's thesis. This situation may be unstable, and wherever instability occurs one of the possible resulting syntheses may be a level of higher organisation.

"Such a scheme can be worked out for the aggregation of particles in planets, the formation of hydrosphere and atmosphere, and the development of economic processes since the renaissance. J. B. S. Haldane, too, has discussed evolution theory from this viewpoint, distinguishing three Hegelian triads:

Thesis	Antithesis	Synthesis
1) Heredity	Mutation	Variation
2) Variation	Selection	Evolution
3) Selection	Consequent loss of fitness in the species	Survival of species showing little intra-specific competition

"And so we come to consider Whitehead's own contributions from the biologist's point of view. Unlike so many philosophers, he has always appreciated the structure of our world in its succession and its envelopes. Perhaps one of his most famous and influential passages was that in which he said: 'Science is taking on a new aspect which is neither purely physical, nor purely biological. It is becoming the study of organisms. Biology is the study of the larger organisms; whereas physics is the study of the smaller organisms.' And so, regarding envelopes: 'In surveying nature, we must remember that there are not only basic organisms whose ingredients are merely aspects of eternal objects' (i.e., the ultimate particles of physics, each of which is related to everything else in the universe by its bare coexistence)." Mr. Needham quotes Mr. Whitehead:

"There are also organisms of organisms. Suppose for the moment and for the sake of simplicity we assume, without any evidence, that electrons and hydrogen nuclei are such basic organisms. Then the atoms, and the molecules, are organisms of a higher type, which also represent a compact definite organic unity. But when we come to the larger aggregations of matter, the organic unity fades into the background. It appears to be but faint and elementary. It is there; but the pattern is vague and indecisive. It is a mere aggregation of effects. When we come to living beings, the definiteness of pattern is recovered, and the organic character again rises into prominence."

Note that Mr. Whitehead is on guard against supposing that electrons and hydrogen nuclei are basic units. Mr. Needham, on page 249, begins a sentence "Ultimate particles, the proton, electron, etc.," — but this is obviously a slip. If those are ultimate particles, then some early hope of describing, even explaining, living creatures by mechanics could be entertained. But it is much more likely that ultimate particles will turn out to be mathematical points (the *Nyaya anu*, in Indian thought), and that what we call life-properties will be functions of the field, as Gustaf Stromberg suggests, if we understand him correctly.

Mr. Needham goes on: "Elsewhere Whitehead explains why he ignores for the most part nineteenth-century idealism. It was, he says, too much divorced from the scientific outlook, yet at the same time it swallowed the scientific scheme in its entirety and then explained it away as being an idea in some ultimate mentality. He leaves open, however, a final decision on the metaphysical issue: "... however you take it, these idealistic schools have conspicuously failed to connect, in any organic fashion, the fact of nature with their idealistic philosophies. So far as concerns what will be said in these lectures [*Science and the Modern World*], your ultimate outlook may be realistic or idealistic. My point is that a further stage of provisional realism is required in which the scientific scheme is recast, and founded upon the ultimate concept of organism."

"While this failure to close the door definitely on idealism has endeared him to theologians such as Thornton, many scientists have preferred the robust

materialism of the Marxists. No Marxist, however, could be more strongly opposed to mechanical materialism than Whitehead.

"My aim," he says, 'is briefly to point out how both Newton's contribution and Hume's contribution are, each in their way, gravely defective. They are right as far as they go. But they omit those aspects of the Universe as experienced, and of our modes of experiencing, which jointly lead to the more penetrating ways of understanding. In the recent situations at Washington, D. C., the Hume-Newton modes of thought can only discern a complex transition of sensa, and an entangled locomotion of molecules, while the deepest intuition of the whole world discerns the President of the United States inaugurating a new chapter in the history of mankind. In such ways the Hume-Newton interpretation omits our intuitive modes of understanding.'

"In other words, what the President does is relevant to events at an extremely high level of organization, and the concomitant atomic happenings are not directly concerned, though they underlie, and are entirely presupposed by, all that goes on at that high level.

"Whitehead proceeds to his famous attack on the notion of 'simple location.' 'To say that a bit of matter has *simple location* means that, in expressing its spatio-temporal relations, it is adequate to state that it is where it is, in a definite region of space, and throughout a definite finite duration of time, *apart from any essential reference of the relations of that bit of matter to other regions of space and to other durations of time*. Again, this concept of simple location is independent of the controversy between the absolutist and the relativist views of space or of time. So long as any theory of space, or of time, can give a meaning, either absolute or relative, to the idea of a definite region of space, and of a definite duration of time, the idea of simple location has a perfectly definite meaning. This idea is the very foundation of the seventeenth century scheme of nature. Apart from it, the scheme is incapable of expression. I shall argue that among the primary elements of nature as apprehended in our immediate experience, there is no element whatever which possesses this character of simple location. It does not follow, however, that the science of the seventeenth century was simply wrong. I hold that by a process of constructive abstraction we can arrive at abstractions which are the simply-located bits of material, and at other abstractions which are the minds included in the scientific scheme. Accordingly, the real error is an example of what I have termed: The Fallacy of Misplaced Concreteness.'

"To the biologist all this was extremely welcome. If for three hundred years he had been a 'mechanist' following in the footsteps of Descartes and la Mettrie, it was not because he felt satisfied with the seventeenth-century statistical picture of the fortuitous concourse of particles, each with a momentarily defined exact position in space, but because there was no other scheme by the aid of which he could proceed with the causal analysis of biological phenomena. The diffi-

culties rose, of course, to a wild crescendo in the science of embryology at the turn of the century. When experimental embryology was put on a firm foundation by Wilhelm Roux, it was supposed that all eggs showed what is called 'mosaic' development, that is to say, they would, if injured or divided, produce a finished organism lacking precisely all that would have developed from those parts which had been destroyed or removed.

"About 1895, however, the discovery was made (and this is what has secured Hans Driesch's name in history, not what he wrote long afterwards) that in many eggs, at any rate, all kinds of interferences could be made without affecting at all the embryo resulting. Large pieces could be removed from the egg, several blastomeres could be taken away, or the blastomeres could be shuffled at will, and yet a normal, though small-sized, embryo would result. Any one monad in the original egg-cell, then, was capable of forming any part of the finished embryo. Driesch was quite right in proclaiming that this was beyond the powers of any machine such as man has ever constructed, but he soon left the straight and narrow path by insinuating his non-material entelechy into the works as the inevitable transcendent mechanic or driver.

"C. D. Broad's comment deserves to be better known: 'If you want a mind that will construct its own organism, you may as well postulate God at once. If he cannot perform such a feat, it is hardly likely that what has been hidden from the wise and prudent will be revealed to entelechies.' Looking at the matter today after the passage of forty years of research in experimental morphology, we realise that what these early workers were up against was a very general process in development which we now speak of as Determination.

The individual cells of the very young organism are not strictly determined as to their fate in the finished product, and this determination comes about as development goes on, partly at least through the action of chemical substances, about which we already know a good deal. But the important point is that these chemical substances (the Evocators and Organisers) do not act at random, but faithfully in accordance with that plan of the body which is decreed by the characters of the species, whether embodied in the nuclear chromosomes or perhaps in the cytoplasm of the egg, a plan the field properties of which have given it the name of Individuation Field. Hence the fate of a given monad, protein molecule, atomic group, or what have you, in the original egg, is a function of its position in the whole. And thus we have a typical instance of the way in which the concept of simple location is hopelessly inadequate to cope with the facts arising in biological studies.

"The reader may be referred to Whitehead's own writings for an account of why it is inadequate in physics also; but others have made similar approaches, for example Wolfgang Köhler, starting from psychology, with his theory of physical 'Gestalten.' According to Whitehead, all the things in the world are to be conceived as modifications of conditions within space-time, extending throughout its whole range, but having a central focal region, which is in common speech 'where the thing is.' In topographic analogy, such as thermodynamicians use, the influence of the thing grades off past successive contours, like the slopes of Fujiyama, in every direction. The connection of this idea with the sort of fact which we are always meeting in biology, namely phenomena of field character, is obvious, and to-day the concept of field is equally widespread and necessary in physics as in biology."

SOURCES OF RUSSIAN CULTURE

OUTLINES OF RUSSIAN CULTURE, by Paul Miliukov, is a three-volume study of contemporary interest, especially for the reader who has familiarised himself with Russian history. Comprehensive scholarship and thoroughness are evident throughout, but it is clear that the work is done from a special point of view. The author is eighty-two. The portions interpreting ancient Russian history are particularly valuable, for in them Dr. Miliukov points out repeatedly that Russia has lagged behind Europe in time. In the first volume, we see how late Christianity came to Russia (about A.D. 1000) and the immense difficulties it encountered in converting pagan Russia; according to the author, the people were still in a state of barbarism. He feels strongly, furthermore, that the powerful Byzantine influence, which spread as Christianity became the national religion, had an overwhelm-

OUTLINES OF RUSSIAN CULTURE, by Paul Miliukov, translated by Valentine Ughet and Eleanor Davis, edited by Michael Karpovich, University of Pennsylvania Press, Philadelphia (and Humphrey Milford, Oxford University Press), 1942, three volumes, 509 pages, \$5. (Each volume sold separately.)

Book Notice

ingly formalising effect for a long period. Together with this, it is important to keep in mind the strongly oriental elements which entered Russia from Persia, India and China. Thus, Russia's solidarity with the East at this historic hour is seen to be a natural manifestation.

The other two volumes are devoted to literature and architecture, and here Dr. Miliukov develops the point that Russia's accomplishments are recent and that Russia has come far in a short time. The history of Russian culture is brought up to the present day in each department, and, though written necessarily from the author's highly personal point of view, these portions are nevertheless provocative. In anticipation of increasingly close relations that Russia will have with the rest of the world, the University of Pennsylvania Press has done a public service by making this material available. D. v. G.